

**COURSE SPECIFICATION FORM,**  
approved by the Academic Council 17.06.2015 (#39)

**SECTION A: DEFINITIVE**

*Items in this section may be reviewed and developed within Schools as part of the Annual Program Monitoring Process and in line with the Guidelines to Modifications to Programs and Courses.*

<b>1. General course information</b>			
1.1	School: SSH	1.6	Credits (ECTS): 6
1.2	Course Title: Research Methods	1.7	Course Code: PHYS395
1.3	Pre-requisites: PHYS261	1.8	Effective from: 2020 (year)
1.4	Co-requisites: None		
1.5	<p style="text-align: center;"><u>Physics</u></p> <input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective Programs: <i>(in which the course is offered)</i>		
<b>2. Course description (max.150 words)</b>			
<p>This course is designed to help students acquire basic knowledge and skills that are essential in everyday research work in modern academic, industrial, and government environments. Specific topics include: characteristics of good research, science ethics, science funding, research proposals, gathering and critical evaluation of scientific information, bibliometrics and scientometrics, writing scientific reports and white papers, publication process in peer-reviewed journals, preparing technical oral presentations, dissemination of research results, proprietary vs open science, science policies and advocacy, public outreach, and others. Along with the general concepts relevant to those topics, the students will learn how to use various tools and software commonly used in the physics community.</p>			
<b>3. Summative assessment methods (tick if applicable):</b>			
3.1	Examination <input type="checkbox"/>	3.5	Presentation <input checked="" type="checkbox"/>
3.2	Term paper <input type="checkbox"/>	3.6	Peer-assessment <input checked="" type="checkbox"/>
3.3	Project <input checked="" type="checkbox"/>	3.7	Essay <input checked="" type="checkbox"/>
3.4	Laboratory Practicum <input type="checkbox"/>	3.8	Other ( <i>specify</i> ) _____
<b>4. Course aims</b>			
1) Provide an outlook of the modern science scene 2) Foster scientific creativity 3) Improve the ability to search, filter, analyze, compress, and summarize scientific information 4) Improve the ability to present scientific knowledge to peers and general public 5) Learn ways of peer evaluation 6) Learn common technical and software tools for the analysis of data, report preparation, and publishing			
<b>5. Course learning outcomes (CLOs)</b>			
5.1	By the end of the course the student will be expected to be able to: 1) Collect and analyze information from various sources and prepare coherent presentation of his or her findings 2) Use appropriate presentation techniques to present the selected topic(s) in physics		

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	3) Demonstrate improvement in communication and writing skills by writing a review paper, abstract and giving a presentation																
5.2	<table border="1" data-bbox="280 309 1409 672"> <thead> <tr> <th data-bbox="280 309 403 427"><b>CLO ref #</b></th> <th data-bbox="403 309 746 427"><b>Program Learning Outcome(s) to which CLO is linked</b></th> <th data-bbox="746 309 1409 427"><b>Graduate Attribute(s) to which CLO is linked</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="280 427 403 504">1</td> <td data-bbox="403 427 746 504">1, 2</td> <td data-bbox="746 427 1409 504">Possess an in-depth and sophisticated understanding of their domain of study;</td> </tr> <tr> <td data-bbox="280 504 403 580">2</td> <td data-bbox="403 504 746 580">2, 3, 5, 6</td> <td data-bbox="746 504 1409 580">Intellectually agile, curious, creative, and open-minded;</td> </tr> <tr> <td data-bbox="280 580 403 622">3</td> <td data-bbox="403 580 746 622">4, 6</td> <td data-bbox="746 580 1409 622" rowspan="2">Fluent and nuanced communicators across languages and cultures;</td> </tr> <tr> <td data-bbox="280 622 403 672">4</td> <td data-bbox="403 622 746 672">4, 7</td> </tr> </tbody> </table>			<b>CLO ref #</b>	<b>Program Learning Outcome(s) to which CLO is linked</b>	<b>Graduate Attribute(s) to which CLO is linked</b>	1	1, 2	Possess an in-depth and sophisticated understanding of their domain of study;	2	2, 3, 5, 6	Intellectually agile, curious, creative, and open-minded;	3	4, 6	Fluent and nuanced communicators across languages and cultures;	4	4, 7
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**SECTION B: NON-DEFINITIVE**

**Course Syllabus Template**

Details of teaching, learning and assessment

*Items in this Section should be considered annually (or each time a course is delivered) and amended as appropriate, in conjunction with the Annual Program Monitoring Process. The template can be adapted by Schools to meet the necessary accreditation requirements.*

6. Detailed course information					
6.1	Academic Year: 2020	6.3	Schedule (class days, time): MWF 2PM		
6.2	Semester: Spring	6.4	Location (building, room): 7.246		
7. Course leader and teaching staff					
Position		Name	Office #	Contact information	Office hours/or by appointment
Course Leaders		Sergiy Bubin	7e.333	+7 (7172) 694663 sergiy.bubin@nu.edu.kz	T 4:00PM -5:00PM H 12:00PM-1:00PM
		Thomas Oikonomou	7e.536	+7(7172) 704673 thomas.oikonomou@nu.edu.kz	M 15:00-16:00
		Constantinos Valagiannopoulos	7e.337	+7 (7172) 709103 konstantinos.valagiannopoulos@nu.edu.kz	by appointment
Course Instructor(s)					
Teaching Assistant(s)					
8. Course Outline					
Session	Date (tentative)	Topics and Assignments		Course Aims (ref. # only, see item 4)	CLOs
	Week 1	Assessing quality of scientific research		1,2	1
	Week 1-2	Science ethics, plagiarism, retraction of papers		1	1
	Week 2	Science funding		1,2	1
	Week 2-3	Search of information, bibliometric databases, citation data		1,3	1
	Week 2-3	Publication in scientific journals		1	1,2
	Week 3	Writing technical documents. LaTeX.		3,6	1,2,3
	Week-3-4	Plotting and visualizing data		4,6	2,3
	Week 4	Assignment on LaTeX typesetting		6	2,3
	Week 4-5	Oral presentation on assigned journal papers		3,4	1,2,3
	Week 6	Open Science and Patents		3,4,6	1
	Week 7	Science Policy making and Conferences		1,3,4	1,2,3
	Week 8	Data management		3,4,6	1,2
	Week 9	Careers in Physics		1,2	1,2,3
	Week 10	Hand in assignment on bibliography in LaTeX			
	Week 11	Studying a scientific manuscript. Fast vs slow reading.		1,2,3	1,3

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	Week 12	Scientific journals scopes and data/graphs representation.	3,6	3
	Week 13	Presenting and advertising the research work.	2,4	2
	Week 14	Oral presentation on assigned journal papers.	3,4	1,2,3
<b>9.</b>	<b>Learning and Teaching Methods</b> (briefly describe the approaches to teaching and learning to be employed in the course)			
1	Lectures			
2	Practical software demonstrations on a large screen			
3	Assignment feedback by instructor			
<b>10.</b>	<b>Summative Assessments</b>			
<b>#</b>	<b>Activity</b>	<b>Date</b> (tentative)	<b>Weighting (%)</b>	<b>CLOs</b>
1	LaTeX typesetting assignment	31/1/2020	16.7	all
2	Oral presentation summarizing a research paper of student's choice from major scientific journal (Sergiy Bubin)	5-12/2/2020	16.7	all
3	Annotated Bibliography	18/3/2020	16.6	all
4	CV	18/3/2020	16.7	all
<b>11.</b>	<b>Grading</b>			
<b>Letter Grade</b>	<b>Percent range</b>	<b>Grade description</b> (where applicable)		
According to NU grading policies				
<b>12.</b>	<b>Learning resources</b> (use a full citation and where the texts/materials can be accessed)			
<b>E-resources, including, but not limited to: databases, animations, simulations, professional blogs, websites, other e-reference materials (e.g. video, audio, digests)</b>	arxiv.org Google scholar, Scopus, Web of Knowledge APS and AIP journals			
<b>E-textbooks</b>				
<b>Laboratory physical resources</b>	Use of the computer lab in a free time is allowed			
<b>Special software programs</b>	LaTeX Gnuplot Matlab Mathematica PowerPoint			
<b>Journals (inc. e-journals)</b>				
<b>Text books</b>	No particular text has been assigned to this class. Below are two recommended texts from the library, similar materials may be helpful. 1. Lowe, Susan, "Presenting", DELTA Publishing, 2009 2. Powell, Mark, "Presenting in English: How to give successful presentations" Heinle, Cengage Learning, 2002			
<b>13.</b>	<b>Course expectations</b>			

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**Attendance policy**

Students are expected to attend all lectures, as participation in every class activities is the integral part of the class. Failure to do so without valid excuse will result in the final grade reduction of one division (e.g. A to A-, etc) per each class missed.

**Office Hours Policy**

Every student is encouraged to visit my office hours. It is mandatory for students to come to office hours at least once before their presentation date. Please set up the appointments with us if current office hours are in conflict with your other academic endeavors.

**Class participation**

Students must participate in class discussions and provide peer feedback.

**Classroom decorum**

No food or drinks are allowed in the classroom. All the electronic devices (such as laptops, cell phones, etc) should be turned off during lectures and labs, unless otherwise instructed.

**Late-to-class policy**

Please be on-time. The presentation will start promptly each class so being more than 5 minutes late without a valid excuse will count as absence!

**Late assignments**

10 % from the assignment grade will be subtracted for every late consecutive day pass the deadline, unless a valid, documental excuse is provided.

**Electronic resources**

You are expected to regularly check your Nazarbayev University email and Moodle course page

**14. Academic Integrity Statement**

You are welcome and encouraged to get assistance on your presentation from your fellow students, professors and other sources. However, the work you present should be your own and reflect your own understanding of the subject. All material from outside sources should be properly referenced. Anyone intentionally violating these guidelines will fail the course and will be charged with academic dishonesty and subject to NU's disciplinary procedures described in Student Code of Conduct and Disciplinary Procedures (approved by the AC on 05.02.2014), specifically, paragraphs 13-16 (plagiarism and cheating).

**15. E-Learning**

n/a

**16. Approval and review**

Date of Approval: 11/12/2017	Minutes #: 31	Committee: D Beznosko, T Oikonomou
Date(s) of Approved Change:	Minutes #:	